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09/323,020	06/01/1999	TATSUYA YAGUCHI	862.2851	8742

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EXAMINER

ODOM, CURTIS B

ART UNIT	PAPER NUMBER
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2634

DATE MAILED: 05/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/323,020

Applicant(s)

YAGUCHI, TATSUYA

Examiner

Curtis B. Odom

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 June 1999.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-47 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14, 18-28, 32-37, 41-45 is/are rejected.
- 7) ☒ Claim(s) 15-17, 29-31, 39, 40, 46 and 47 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 June 1999 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 244
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 3-7, 10-13, 32, 34, 37, and 38 are rejected under 35 U.S.C. 102(e) as being anticipated by Miki et al. (U.S. Patent No. 5, 724, 378).

Regarding claim 1, Miki et al. discloses a reception apparatus (Fig. 3B) comprising:

a plurality of channel estimation means (Fig. 3B, blocks 16-1 – 16-M, column 7, lines 23-26);

combining means (Fig. 3B, blocks 18-1 – 18-K, column 7, lines 53-56) for combining signals from paths in accordance with outputs from the plurality of channel estimation means; and

evaluating means (Fig. 3B, blocks 19-1 – 19-K, column 7, lines 62-64) for evaluating the outputs from the plurality of channel estimation means in accordance with outputs from the combining means which respectively correspond to the plurality of channel estimation means.

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Regarding claim 3, which inherits the limitations of claim 1, Miki et al. further discloses the combining means comprises a plurality of combiners corresponding to the plurality of channel estimation means (Fig. 3B, blocks 18-1 – 18-K, column 7, lines 53-56).

Regarding claim 4, which inherits the limitations of claim 1, Miki et al. further discloses the channel estimation means estimates a channel from a de-spread reception signal (column 6, lines 14-18).

Regarding claim 5, which inherits the limitations of claim 1, Miki et al. further discloses one of the channel estimation means estimates a channel by an interpolation method (column 7, lines 28-31).

Regarding claim 6, which inherits the limitations of claim 1, Miki et al. further discloses using an averaging method to estimate a channel (column 7, lines 31-36). Miki et al. does not disclose using the double slot averaging method. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made that since both methods use an averaging function to perform a channel estimation that the double slot averaging method could have been implemented by the channel estimators. Thus, using the double slot averaging method does not constitute patentability.

Regarding claim 7, which inherits the limitations of claim 1, Miki et al. further discloses the evaluation means comprises decoding means in accordance with an evaluation (Figs. 1 and 3B, blocks 19-1 – 19-K, column 2, lines 32-35).

Regarding claim 10, which inherits the limitations of claim 1, Miki et al. further discloses the evaluation means evaluates the outputs from the plurality of channel estimation means with

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respect to pilot symbols (column 7, lines 62-25), wherein the received information symbols include pilot symbols (column 7, lines 26-31).

Regarding claim 10, which inherits the limitations of claim 1, Miki et al. further discloses the evaluation means evaluates the outputs from the plurality of channel estimation means with respect to periodically received pilot symbols (column 7, lines 26-31 and column 7, lines 46-52).

Regarding claim 12, which inherits the limitations of claim 1, Miki et al. further discloses the evaluation means evaluates the outputs from the plurality of channel estimation means in units of frames (Fig. 5A, column 7, lines 23-26), wherein evaluation means also receives the signal in the frame format.

Regarding claim 13, which inherits the limitations of claim 1, Miki et al. discloses the evaluation means evaluates the outputs from the plurality of channel estimation means with respect to frames (Fig. 5A, column 7, lines 23-26). Miki et al. does not disclose the frames include frame error detection codes. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made that using frame error detection codes at the transmitter would reduce the probability of reception errors at the receiver as simply the recovery of the information signal. Thus, using frame error detection codes does not constitute patentability.

Regarding claim 32, Miki et al. discloses a reception method comprising the steps of:
performing (Fig. 3B, blocks 16-1 – 16-M, column 7, lines 23-26) a plurality of channel estimations;

combining (Fig. 3B, blocks 18-1 – 18-K, column 7, lines 53-56) signals from paths in accordance with the respective results of the plurality of channel estimations; and

evaluating the results of the plurality of channel estimations in accordance with combination results obtained in the combining step for the plurality of channel estimations (Fig. 3B, blocks 19-1 – 19-K, column 7, lines 62-64).

Regarding claim 34, which inherits the limitations of claim 32, Miki et al. further discloses the channel estimation step comprises estimating a channel from a de-spread reception signal (column 6, lines 14-18).

Regarding claim 37, which inherits the limitations of claim 32, Miki et al. further discloses the evaluation step comprises evaluating the plurality of channel estimations with respect to pilot symbols (column 7, lines 62-25), wherein the received information symbols include pilot symbols (column 7, lines 26-31).

Regarding claim 38, which inherits the limitations of claim 32, Miki et al. further discloses the evaluation step comprises evaluating plurality of channel estimations in units of frames (Fig. 5A, column 7, lines 23-26), wherein evaluation means also receives the signal in the frame format.

3. Claims 18-28 and 41-45 are rejected under 35 U.S.C. 102(e) as being anticipated by Dobrica (U.S. Patent No. 6, 070, 086).

Regarding claim 18, Dobrica discloses a reception apparatus comprising:
a plurality of channel estimation means (Fig. 2, blocks 41-46, column 6, lines 11-14);
combining (Fig. 2, block 30, column 6, lines 14-17) means for combining signal from paths in accordance with outputs from the plurality of channel estimation means;
detection means (Fig. 3, blocks 103 and 104, column 10, lines 27-39, wherein error rate measurements are based on EbIo measurements (column 2, lines 36-44)) for detecting errors of

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outputs from the combining means which respectively correspond to the plurality of channel estimation means; and

selection means (Fig. 3, block 106, column 1, lines 1-9) for selecting one of the outputs from the combining means which respectively correspond to the plurality of channel estimation means in accordance with an error detected by the detection means.

Regarding claim 19, which inherits the limitations of claim 18, Dobrica discloses a combining means (Fig. 2, block 30, column 6, lines 14-17), but does not disclose the combining means comprises a plurality of combiners corresponding to the plurality of channel estimation means. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made that the combiner of Dobrica could have comprised of multiple combiners in order to maximize the signal to interference ratio of the path signals (see Miki et al., U.S. Patent No. 5, 724, 378, Fig. 3B, block 18-1 –18-K). Therefore, a plurality of combiners does not constitute patentability.

Regarding claim 20, which inherits the limitations of claim 18, Dobrica further discloses the channel estimation means estimates a channel from a de-spread reception signal (column 6, lines 7-9).

Regarding claim 21, which inherits the limitations of claim 18, Dobrica further discloses one of the channel estimation means estimates a channel by an interpolation method (column 6, lines 9-14).

Regarding claim 22, which inherits the limitations of claim 18, Dobrica further discloses using an interpolation method to estimate a channel (column 6, lines 9-14). Dobrica does not disclose using the double slot averaging method. However, it would have been obvious to one of

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ordinary skill in the art at the time the invention was made that since an interpolation method can include an averaging function to perform a channel estimation that the double slot averaging method could have been implemented by the channel estimators. Thus, using the double slot averaging method does not constitute patentability.

Regarding claim 23, which inherits the limitations of claim 18, Dobrica further discloses the selection means comprises decoding means for decoding one of the outputs from the combining means (Fig. 2, block 60, column 6, lines 19-21).

Regarding claim 24, which inherits the limitations of claim 18, Dobrica further discloses the detection means comprises decision means (Fig. 3, block 101, column 10, lines 20-24) for performing symbol decision in accordance with the outputs from the combining means which respectively correspond to the plurality of channel estimation means, and selects (Fig. 3, block 106, column 1, lines 1-9) one of the outputs from the combining means accordance with an error rate of an output from the decision means.

Regarding claim 25, which inherits the limitations of claim 18, Dobrica further discloses the selection means selects one of the outputs from the combining means with an error detected with respect to a pilot symbols (column 6, lines 9-14).

Regarding claim 26, which inherits the limitations of claim 18, Dobrica further discloses the selection means selects one of the outputs from the combining means with an error detected with respect to periodically received pilot symbols (column 5, lines 22-25).

Regarding claim 27, which inherits the limitations of claim 18, Dobrica further discloses the selection means selects one of the outputs from the combining means in units of frames (Fig. 1, column 5, lines 22-28).

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Regarding claim 28, which inherits the limitations of claim 18, Dobrica further discloses the selection means selects one of the outputs from the combining means in units of frames (Fig. 1, column 5, lines 22-28). Dobrica al. does not disclose the frames include frame error detection codes. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made that using frame error detection codes at the transmitter would reduce the probability of reception errors at the receiver as simply the recovery of the information signal. Thus, using frame error detection codes does not constitute patentability.

Regarding claim 41, Dobrica et al. discloses a reception method comprising:

performing a plurality of channel estimation means (Fig. 2, blocks 41-46, column 6, lines 11-14);

combining (Fig. 2, block 30, column 6, lines 14-17) signals from paths in accordance with results from the plurality of channel estimations;

detecting (Fig. 3, blocks 103 and 104, column 10, lines 27-39, wherein error rate measurements are based on EbIo measurements (column 2, lines 36-44)) errors of combination results in the combining step which respectively correspond to the plurality of channel estimations; and

selecting (Fig. 3, block 106, column 1, lines 1-9) one of the combination results in the combining step which respectively correspond to the plurality of channel estimations in accordance with an error detected in the detection step.

Regarding claim 42, which inherits the limitations of claim 11, Dobrica further discloses the channel estimation step comprises estimating a channel from a de-spread reception signal (column 6, lines 7-9).

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Regarding claim 43, which inherits the limitations of claim 41, Dobrica further discloses the selection step comprises performing (Fig. 3, block 101, column 10, lines 20-24) a symbol decision in accordance with the outputs from the combining step which respectively correspond to the plurality of channel estimations, and selects (Fig. 3, block 106, column 1, lines 1-9) one of the outputs from the combining step in accordance with an error rate of an output from the decision step.

Regarding claim 44, which inherits the limitations of claim 41, Dobrica further discloses the selection step comprises selecting one of the outputs from the combining step with an error detected with respect to a pilot symbols (column 6, lines 9-14).

Regarding claim 45, which inherits the limitations of claim 41, Dobrica further discloses the selection means selects one of the outputs from the combining step in units of frames (Fig. 1, column 5, lines 22-28).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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5. Claims 2, 8, 9, 14, 33, 35 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miki et al. (U.S. Patent No. 5, 724, 378) in view of Dobrica (U.S. Patent No. 6, 070, 086).

Regarding claim 2, which inherits the limitations of claim 1, Miki et al. discloses all the limitations of claim 2 (see rejection of claim 1) except the evaluation means comprises selection means for selecting one of the outputs from the combining means which respectively correspond to the plurality of channel estimations means in accordance with an evaluation.

However, Dobrica discloses an the evaluation means (Fig. 3, block 100) which comprises a selection means (Fig. 3, block 106, column 1, lines 1-9) for selecting one of the outputs from the combining means (Fig. 2, block 30, column 6, lines 14-17) which respectively correspond to the plurality of channel estimations means (Fig. 2, blocks 41-46, column 6, lines 11-14) in accordance with an evaluation (EbIo measurement). Therefore, it would have been obvious to one of ordinary skill in the art the modify the reception apparatus of Miki et al. with the selection means of Dobrica in order to have the capability of selecting the channel with the best channel estimation which would reduce the probability of errors during further processing of the signal and minimize system interference, thus increasing overall system capacity.

Regarding claims 8 and 35, which inherits the limitations of claim 1, Miki et al. discloses all the limitations of claims 8 and 35 (see rejection of claims 1 and 32) except the evaluation means and step comprises evaluating the outputs from the plurality of channel estimation means in accordance with error rates of the outputs from the combining means which respectively correspond to the outputs from the plurality of channel estimation means.

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However, Dobrica discloses an the evaluation means (Fig. 3, block 100) which evaluates the outputs from the plurality of channel estimation means in accordance with error rates (column 10, lines 27-39, wherein error rate measurements are based on EbIo measurements (column 2, lines 36-44)) of the outputs from the combining means which respectively correspond to the outputs from the plurality of channel estimation means. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the reception apparatus of Miki et al. with the evaluation means and teachings of Dobrica to have the capability to evaluate error rates in the system which would allow the system to combat the effects of received power variations (Rayleigh fading) and minimize system interference, thus increasing overall system capacity.

Regarding claims 9 and 36, which inherits the limitations of claims 1 and 32, Miki et al. discloses all the limitations of claims 9 and 32 (see rejection of claims 1 and 32) including the evaluation means/step comprises decision means (Fig. 3B, 19-1 –19-K, column 7, lines 62-65) for performing symbol decision in accordance with the outputs from the combining means which respectively correspond to the plurality of channel estimation means. Miki et al. does not disclose the evaluation means/step evaluates the outputs from the plurality of channel estimation means in accordance with error rates of outputs from the decision means or results from the desicion step.

However, Dobrica discloses an the evaluation means (Fig. 3, block 100) which evaluates the outputs from the plurality of channel estimation means in accordance with error rates (column 10, lines 27-39, wherein error rate measurements are based on EbIo measurements (column 2, lines 36-44)) of outputs from a decision means (Fig. 3, block 101). Therefore, it

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would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the reception apparatus of Miki et al. with the evaluation means of Dobrica to have the capability to evaluate error rates in the system which would allow the system to combat the effects of received power variations (Rayleigh fading) and minimize system interference, thus increasing overall system capacity.

Regarding claim 14, which inherits the limitations of claim 1, Miki et al. discloses all the limitations of claim 14 (see rejection of claim 1) except the evaluation means comprises selection means for selecting one of the outputs from the combining means which respectively correspond to the plurality of channel estimations means in units of frames in accordance with an evaluation.

However, Dobrica discloses an the evaluation means (Fig. 3, block 100) which comprises a selection means (Fig. 3, block 106, column 1, lines 1-9) for selecting one of the outputs from the combining means (Fig. 2, block 30, column 6, lines 14-17) which respectively correspond to the plurality of channel estimations means (Fig. 2, blocks 41-46, column 6, lines 11-14) in units of frames (Fig. 1, column 5, lines 22-54) in accordance with an evaluation (EbIo measurement). Therefore, it would have been obvious to one of ordinary skill in the art the modify the reception apparatus of Miki et al. with the selection means of Dobrica in order to have the capability of selecting the channel with the best channel estimation which would reduce the probability of errors during further processing of the signal and minimize system interference, thus increasing overall system capacity. Using unit of frames with pilot symbols also allows the system to estimate and correct phase and amplitude fluctuations by absolute coherent detection using pilot interpolation.

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Regarding claim 33, which inherits the limitations of claim 32, Miki et al. discloses all the limitations of claim 33 (see rejection of claim 32) except the estimation step comprises the selection step for selecting one of the combination results obtained in the combination step for the plurality of channel estimations.

However, Dobrica discloses an the estimation step which comprises a selection step (Fig. 3, block 106, column 1, lines 1-9) for selecting one of the combination results (Fig. 2, block 30, column 6, lines 14-17) obtained in the combination step for the plurality of channel estimations means (Fig. 2, blocks 41-46, column 6, lines 11-14). Therefore, it would have been obvious to one of ordinary skill in the art the modify the method of Miki et al. with the selection step of Dobrica in order to have the capability of selecting the channel with the best channel estimation which would reduce the probability of errors during further processing of the signal and minimize system interference, thus increasing overall system capacity.

Allowable Subject Matter

6. Claims 15-17, 29-31, 39-40 and 46-47 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Wan et al. (U.S. Patent No. 6, 539, 205) discloses a channel estimation device using bit error rates.

Koch (U.S. Patent No. 5, 199, 047) discloses a channel estimation device and performing a selection based on the channel estimation.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Curtis B. Odom whose telephone number is 703-305-4097. The examiner can normally be reached on Monday- Friday, 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on 703-305-4714. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9314 for regular communications and 703-872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

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Curtis Odom

May 12, 2003



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